Kasra Ahmadi, Ph.D Candidate.
Work Authorization: U.S. Permanent Residency Process Initiated (Approved I-140 (NIW))
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Summary

Ph.D. candidate in Computer Science with a **3.93 GPA** and a strong background in **Machine Learning**, **Algorithms**, and **Cryptography**. Experienced in conducting high-impact research in **Privacy-preserving AI** and **Post-Quantum Cryptography**. Proven coding skills in Python, C++, and JavaScript, with hands-on work in distributed systems, embedded design, and cloud technologies.

Education

- **Ph.D. in Computer Science** - University of South Florida, Tampa **-** Jan 2022 to Dec 2025 (Expected).
  Focus: **Privacy in ML** and **Post-Quantum Cryptography** | GPA: 3.93
- M.Sc. in Information Technology - Amirkabir University of Technology, Tehran - Sep 2018 to Sep 2021.
  Thesis: Secure file sharing market on Blockchain using smart contracts
- B.Sc. in Computer Science **-** Isfahan University of Technology**,** Isfahan - Sep 2012 to Jul 2017.

Technical Skills

Programming: Python (Proficient), C++ (Intermediate), Java (Intermediate), JavaScript (Proficient)
ML: PyTorch, LangChain, LangGraph, Scikit-learn, Transformers, Flower, Nvidia AI Enterprise Stack
Cloud: AWS (Lambda, Glue, S3, DynamoDB), GCP
Databases: SQL, MongoDB
Embedded: Vivado**,** Vitis, ARM, FPGA, HLS, Cortex-M4
Other: Git, Docker, Scrum, Redis, Websocket, API
Soft-skills: Mentorship, Problem-Solving, Communication, Adaptability

Professional Experience

- **Graduate Research Assistant -** University of South Florida, Tampa, FL Jan 2022 - present
  - Developed a privacy-preserving framework combining differential privacy and **federated learning** to fine-tune **LLMs** on edge devices with limited memory.
  - Designed and implemented integrity mechanisms to guarantee accurate **Neural Network inference**, ensuring trustworthy AI-driven decision-making in safety-critical applications.
  - Designed and implemented algorithm-level error detection for **Post Quantum Cryptographic** protocols (Kyber, Dilithium, ECSM) to protect against fault attacks using ARM and FPGA architectures.
  - Teaching assistant for Cryptography, Operating Systems, and System Design Lab.
- **Machine Learning Engineer Intern** – TD SYNNEX**,** Clearwater, FL May 2025 - Aug 2025
  - Designed a microservice-based hospitality **multi-agent** framework for FIFA WORLDCUP 2026 using **NVIDIA AI Enterprise** stack: NIMs for model serving, AIQ Agent Toolkit for orchestration, **LangGraph** for inter-agent dependencies, and **LangChain** for **RAG** pipelines.
  - Engineered asynchronous Python asyncio loops to execute non-dependent agent tasks (e.g., knowledge retrieval and dialogue management) in parallel, achieving a sustained 25% drop in tail-latency.
  - Deployed services in Docker containers, leveraging NVIDIA GPU Operator to schedule inference workloads across 8×A100 GPUs.
- **Software Engineer Intern** - Agwise**,** St.Petersburg, FL May 2024 - Aug 2024
  - **Led** technical team in designing an event-driven architecture using **AWS** services to build a nutrient recommender system for agriculture.
  - Developed **ETL** pipelines with AWS Lambda and Glue to automate lab data ingestion and recommendation delivery.

- **Machine Learning Engineer,** Paar Lift**,** Tehran Jan 2019 - Apr 2020
  - Engineered predictive elevator dispatch algorithms using deep **Neural Networks** and **ensemble learning** for high-traffic hospitality and mixed-use complexes, achieving a 27% reduction in average passenger wait time.
  - Designed ETL pipelines using Airflow to process elevator traffic data.
  - Developed real-time data capture using Raspberry Pi, CAN Bus, and WebSockets.

Publications & Projects

Machine Learning

- An Interactive Framework for Implementing Privacy-Preserving Federated Learning: Experiments on Large Language Model. **2025 IEEE Security and Privacy Workshops (SPW)**. GitHub, Paper.
- **Privacy-Preserved RAG:** Developed and deployed a secure RAG system using LLMs and embedding techniques to enable efficient querying and understanding of a 100MB document corpus. GitHub.

Cryptography & Cybersecurity

- Efficient Error Detection Schemes for ECSM Window Method Benchmarked on FPGAs. ***IEEE Transactions on Very Large Scale Integration (VLSI) Systems***. GitHub, Paper.
- Efficient Error Detection Cryptographic Architectures Benchmarked on FPGAs for Montgomery Ladder. ***IEEE Transactions on Very Large Scale Integration (VLSI) Systems***. GitHub, Paper.
- PUF-Dilithium/Kyber: Design of a PUF-Based Dilithium/Kyber Architectures Benchmarked on ARM Processors. ***ACM Trans. Embed. Comput. Syst.*** Paper (Dilithium), Paper (Kyber)
- Efficient Algorithm Level Error Detection for Number-Theoretic Transform used for Kyber Assessed on FPGAs and ARM. ***ACM Trans. Embed. Comput. Syst*** *(under-review)* GitHub, Paper.
- Efficient Fault Detection Architectures for Modular Exponentiation Targeting Cryptographic Applications Benchmarked on FPGAs ***IEEE Transactions on Very Large Scale Integration (VLSI) Systems.*** Paper

Blockchain

- Smart Contract based Marketplace**:** P2P file sharing with IPFS and Ethereum smart contracts. Presented at IEEE AIBThings 2023. GitHub, Paper.

Certifications

- **AWS Certified Solutions Architect** - Associate, View Certification (Dec 2023)
- LangChain for LLM Application Development, View Certificate (June 2025)
- Generative AI – NVIDIA Technical AI Advisor, View Certificate (May 2025)
- Deep Neural Networks with PyTorch, View Certificate (Oct 2024)
- Intro to Federated Learning, View Certificate (Oct 2024)
- Artificial Intelligence Privacy and Convenience, View Certificate (Aug 2024)
- Federated Fine-tuning of LLMs with Private Data, View Certificate (Aug 2024)

Achievements & Professional Activities

- Best Paper Award In 2025 IEEE Security and Privacy Workshops (HMISA Workshop).
- Peer Reviewer: IEEE TCAS, IEEE VLSI Systems, ACM TECS (18+ manuscripts).
- PhD research funded by National Science Foundation Grant #1801488.
- EB2 NIW approved.
- Placed in the top 1.5% nationally in Iran's Master's Entrance Exam (Konkur), achieving rank 56 among thousands of candidates.
- Mentor, NSF REU Site: Cryptography and Coding Theory, University of South Florida (Summer 2023).